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# Kongeriget Danmark

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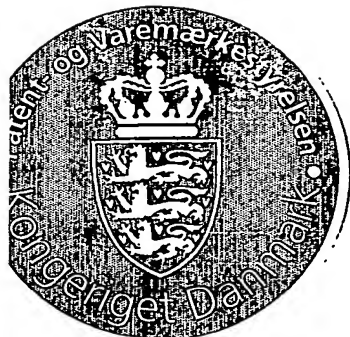
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Patent- og Varemærkestyrelsen  
Økonomi- og Erhvervsministeriet

13 November 2003

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## PRIORITY DOCUMENT

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Modtaget

23 OKT. 2002

Title of the invention

Coupling device.

PVS

Field of the invention

5 The present invention relates to a coupling device comprising a first connector part and a second connector part, each connector part comprising at least one connecting portion for engagement with at least one corresponding connecting portion of the  
10 other connector part, a disengagement means being provided for at least assisting in disengaging the engagement between said connecting portions.

Background of the invention

15 Disabled persons, such as persons having a spinal cord injury or spina bifida or MS, with limited limb movement can often not perform their normal bowel function without the need for outside aids. Examples of such aids are drugs, digital stimulation, massage  
20 or colonic irrigation. Disabled persons are often unable to perform these procedures without help from another person.

One irrigation system is the arrangement disclosed in Applicant's Danish application No. PA 2002 01096,  
25 in which a reservoir is filled with irrigating liquid to a predetermined level. The reservoir is formed as a substantially sealed container and is connected with a probe for arrangement in a user by means of a conduit means.

30 The probe comprises a shaft portion and a fixation member for fixation in rectum in the form of an inflatable cuff. The inflatable cuff is connected with a tube for conducting an inflating medium to the cuff. The other end of the first part of the conduit  
35 means is connected with a control unit.

Generally, irrigation is carried out by inflating the cuff in order to secure the probe in position in the user, sealing against leakage, and subsequently

feeding irrigating liquid from the reservoir through a tube to the probe by means of a pump.

Portability of equipment is extremely important to the user and this irrigation system may readily be transported by disabled persons. However, easy preparation of the irrigation system is also of great importance to such persons if they are to be able to use the irrigation system without aid from an assisting person.

10 In the irrigation system described above, the disposable probe is to be used once and subsequently discarded. Therefore, the user must connect and disconnect the probe from the two tubes leading to the control unit each time he or she uses the irrigation system. The irrigation system may e.g. be provided with two luer type connectors such as the luer locks disclosed in US Patent No. 6,428,515 and US Patent No. 5,620,427 connecting the probe with the tubes leading to the control unit.

20 The male luer lock connector of a single luer lock is traditionally inserted into the female luer lock connector by pressing them together and is removed by pulling and rotating the connectors in opposite directions in a wriggling motion. Disconnection by just pulling the connectors in opposite directions is normally difficult to a non-disabled person, respectively extremely difficult to a disabled person.

Therefore, as is well known in the art, an engagement means in the form of a nut or a sleeve as disclosed in US Patent No. 5,620,427 is mounted on the male luer connector, the engagement means being threaded on a corresponding engagement means disposed on the female luer lock connector, thereby enabling disconnection of the male luer lock connector from the female luer lock connector through a rotating operation that requires less strength and is more manageable than pulling the parts in opposite directions. Also, use of such engagement means facilitates

connecting the luer lock connectors. Thus, by use of this method a disabled person is more likely to readily be able to connect/disconnect the probe from the tubes leading to the control unit.

5        However, when two tubes are arranged with small spacing as is the case in the present irrigation system, neither of the two above mentioned connecting/disconnecting methods are applicable since individual rotation of the tubes is not possible. The  
10 remaining option is to pull the connectors in opposite directions (though a small amount of wriggling could be possible) and thus, for a disabled person it is extremely difficult to connect and especially disconnect the two luer lock connectors.

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#### Summary of the invention

With this background it is an object of the present invention to provide a coupling device that is easy to use.

20        This object is met by means of a coupling device of the kind mentioned in the introduction, which is characterized in that each connector part comprises at least two connecting portions.

By incorporating a plurality of connecting portions in each connector part, the user is able to  
25 connect and disconnect the tubes by himself or herself and thus, e.g. with the irrigation system disclosed in Applicant's Danish application No. PA 2002 01096, to perform the entire irrigation without  
30 the need for outside help.

In one embodiment, the disengagement means is intended for connection with the first connector part and comprises engagement means for engagement with  
corresponding engagement means on the second connector part. The second connector part may comprise a  
35 disk including a through-going hole in connection with each corresponding connecting portion, the engagement means of said connector part being pro-

vided on said disk. The engagement means of the disengagement means may comprise internal threads corresponding to external threads of the engagement means of the second connector part. This provides for  
5 a simple and reliable operation of the coupling device, as the connector parts are pulled towards and away from each other when connecting and disconnecting the connector parts.

In another embodiment, the holes in the disk of  
10 the second connector part are arranged with a small spacing, and/or the external threads of the engagement means of the second connector part comprise at least one recess. In this way, the overall size of the coupling device may be reduced and a particularly  
15 compact design of the coupling device is achieved, which, i.a., makes the coupling device inexpensive in manufacture. However, the external threads may also not comprise any recesses.

In a further embodiment, the engagement means  
20 comprises a bayonet coupling including at least one track in the disengagement means and at least one projection on the second connector part, said at least one track including at least one portion extending obliquely with respect to the axial direc-  
25 tion of the disengagement means.

In another embodiment, at least some of said connecting portions have such an axial extension that the first and the second connector parts are brought into connection with each other before activation of  
30 the disengagement means, thus, engaging in a loose connection, allowing the user to let go of the disengagement means and subsequently get a firmer grip of the disengagement means, the purpose being to enable the user to more readily rotate the disengage-  
35 ment means to connect and/or disconnect the first connector part with the second connector part.

In yet another embodiment, the disengagement means comprises handle means to ease the rotating

operation of the disengagement means when connecting the first connector part with the second connector part and during the disconnecting operation.

In a further embodiment, the first connector part  
5 comprises two male luer lock connecting portions and the second connector part comprises two female luer lock connecting portions.

In another embodiment, each connector part may be provided with more than two connecting portions.  
10 Furthermore, the disengagement means may be mounted on the second connector part, and the design of the connecting portions may be varied, as it is e.g. conceivable to have one female and one male luer lock connector on each connector part.

15 In another aspect of the invention, a probe incorporating the first or the second connector part of a coupling device is provided. Either the male or the female luer lock connector may be attached to the probe.

20 In yet another aspect of the invention, a method of disengaging the engagement between a first and a second connector part of a coupling device is provided.

In a still further aspect of the invention, an  
25 irrigation system is provided, said system comprising a reservoir for irrigating liquid, a probe for arrangement in a user, conduit means for conducting the irrigating fluid from the reservoir to the probe, and a control unit connected with at least one part  
30 of the conduit means, wherein a coupling device is provided at the probe and/or the reservoir and/or the control unit.

Other features and advantages will readily be appreciated from the following description of examples  
35 of embodiments.

#### Brief description of the drawings

In the following the invention will be described

in further detail with reference to the schematic drawings, in which

Fig. 1 shows an irrigation system, which is not as such a part of the invention, incorporating a probe 5 and a coupling device according to the present invention,

Fig. 2 is an exploded sectional view of an embodiment of a coupling device according to the present embodiment,

10 Fig. 3 is a sectional view of a disengagement means attached to a first connector part,

Fig. 3a is a sectional view of an assembled coupling device,

15 Fig. 4 is a perspective view of a second connector part,

Fig. 5 is a perspective view of the first connector part, and

Fig. 6 is a perspective view of the disengagement means.

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#### Detailed description of preferred embodiments

In Fig. 1, an irrigation system is shown, in which a reservoir 1 is filled with irrigating liquid 2 to a predetermined level. The reservoir 1 is formed as a substantially sealed container and is connected with 25 a probe 3 for arrangement in a user by means of a conduit means in a manner that will be described in further detail in the following.

The probe 3 comprises a shaft portion 4 and a 30 fixation member in the form of an inflatable cuff 5. The inflatable cuff 5 is connected with a tube 6 for conducting an inflating medium to the cuff. The probe 3 is furthermore connected with a tube 7 for conducting irrigating liquid. The other ends of the first 35 tubes 6, 7 are connected with a control unit 8. Generally, irrigation is carried out by inflating the cuff 5 in order to secure the probe 3 in position in the user, and subsequently feeding irrigating liquid

2 from the reservoir 1 to the probe 3 by means of a pump 8a.

Fig. 2 shows an embodiment of the coupling device 9 comprising a first connector part 10, a second connector part 11, and a disengagement means 12, the coupling device 9 connecting the probe 3 with the gas conducting tube 6 and the liquid conducting tube 7. In this embodiment of the present invention, the first connector part 10 is provided with two tapered conical portions 13, 14, whereas the second connector part is provided with two corresponding tapered bores 16a, 16b. The connecting portions, i.e. the portions 13, 14 and the bores 16a, 16b may be conical as suggested in the embodiments shown in the drawings, or they may be non-circular, e.g. polygonal, in section. Also, they may have a constant or a varying cross-section and they may have arched as well as rectilinear engagement surfaces. In the present embodiment, the portions 13, 14 and the bores 16a, 16b together constitute two luer lock connectors for connecting the probe 3 with the tubes 6, 7.

The connecting portions of each connector part may have identical or mutually different shapes and dimensions with respect to cross-section and length. By forming the connecting portions mutually differently, the risk of incorrect coupling may be eliminated.

Fig. 3 shows the disengagement means 12 attached to the first connector part 10. Before use of the coupling device 9, the disengagement means 12 in the form of a sleeve or a nut is mounted on the first connector part 10. The disengagement means 12 is kept in place on the first connector part 10 and is rotatably mounted by means of a shoulder portion 17 and a resilient member 15 in such a way that the disengagement means 12 engages with the first connector part 10 by moving the disengagement means 12 in the direction shown in Fig. 2, the disengagement



means 12 sliding over a projection 15a of the resilient member 15, the projection 15a of the resilient member 15 being pushed slightly inwards during this movement, and, subsequently, the projection 15a moving outwards into engagement with a stepped portion 19 of the disengagement means 12. At the opposite end of the disengagement means 12, an engagement means 18 is provided between a central portion 20 and the end of the disengagement means 12. The engagement means 18 of the disengagement means 12 has such dimensions that a step 20a is formed at the transition to the central portion 20. The step 20a abuts on the shoulder portion 17 on the first connector part 10. In the present embodiment, the engagement means 18 of the disengagement means 20 is provided in the form of internal threads 18.

Fig. 3a shows the assembled coupling device 9.

Fig. 4 is a perspective view of the second connector part 11. In the present embodiment, a disk 23 disposed at the end of the second connector part 11 facing the first connector part 10 has a circular shape, thereby allowing the attachment of an engagement means 21 to also have a circular shape. Therefore, engagement means can be implemented through which a rotatable and consequently much less physically demanding mounting of the first connector part 10 on and dismounting of this connector part from the second connector part 11 is possible.

Holes 26, 27 are provided in the circular disk 23 of the second connector part 11 in order to enable flow through the coupling device 9. In the embodiment of Fig. 4, said holes 26, 27 are arranged with a small spacing, e.g. less than 10%, preferably 7% or less of the diameter of the disk (i.a. dependent on the thickness of the tube walls), and furthermore a recess 25 is disposed in the engagement means 21 of the second connector part 11 to make room for the holes 26, 27. This provides the advantage of a

reduction in size of the circular disk 23 of the second connector part resulting in an overall smaller size of the coupling device 9.

Fig. 5 is a perspective view of the first connector part 10, whereas Fig. 6 is a perspective view of the disengagement means 12. Similar to the second connector part 11, a circular disk 24 is provided at the end of the first connector part 10 facing the second connector part 11, allowing the mounting and rotation of the also circular disengagement means 12 on the first connector part 10.

When the disengagement means 12 is attached to the first connector part 10, the engagement means 18 of the disengagement means 12 corresponds to engagement means 21 of the second connector part 11. In the present embodiment, the engagement means 21 of the second connector part 11 is provided in the form of external threads 21. In an embodiment (not shown), the engagement means of the second connector part 11 and the disengagement means 12 is provided in the form of a bayonet coupling, e.g. including one track portion extending obliquely with respect to the axial direction of the disengagement means and a projection, e.g. in the form of a pin member on the second connector part.

Thus, when connecting the first connector part 10 with the second connector part 11, the connection portions on the first connector part 10 engage into the second connector part 11 through a rotating operation of the disengagement means, thereby allowing the connecting portions 13, 14 of the first connector part 10 to more readily be properly connected and/or disconnected with the connecting portions 16a, 16b of the second connector part 11. It is noted that the connector parts move substantially axially with respect to each other during the connecting and disconnecting operations, as activation of the disengagement means entails that the connector

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parts are substantially pushed into and pulled out of each other during connection and disconnection, respectively.

In the embodiment shown in the drawings, the dis-  
5 engagement means 12 is provided with handle means 22 to ease the rotating operation of the disengagement means 12 when connecting the first connector part 10 with the second connector part 11 and during the disconnecting operation.

10 Alternatively, the first connector part 10 and the second connector part 11 may be initially brought together before engagement of the engagement means 21 of the first connector part in the engagement means 21 of the second connector part, the first connector  
15 part 10 and the second connector part 11 thus engaging in a loose connection, allowing the user to let go of the disengagement means 12 and subsequently get a firmer grip of the disengagement means 12, the purpose being to enable the user to more readily  
20 rotate the disengagement means to connect and/or disconnect the first connector part 10 with the second connector part 11.

The invention should not be regarded as being limited to the embodiment shown and described in the  
25 above but various modifications may be carried out without departing from the scope of the claims.

For instance, each connector part may be provided with more than two connecting portions. Furthermore, the disengagement means may be mounted on the second  
30 connector part, and the design of the connecting portions may be varied, as it is e.g. conceivable to have one female and one male luer lock connector on each connector part. Also, either the male or the female luer lock connector may be attached to the  
35 probe 3.

The connecting portions 16a, 16b, 13, 14 are not necessarily of a luer lock type, they may instead include two disks, each with two holes and further,

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each hole may be enclosed by sealing members. In such a design, the holes may be pushed together and sealed by activating the disengagement means.

Alternatively, the disengagement means 12 the dis-  
5 engagement means is e.g. applied only when disconnecting the first connector part 10 from the second connector part 11. Thus, the first connector part 10 and the second connector part 11 may be engaged into each other by just pushing the two connector parts  
10 10, 11 into each other, without activating the engagement means 21, 18. However, as in the embodiments described above, the first connector part 10 and the second connector part 11 are disengaged by activating the disengagement means. This alternative  
15 provides for a faster assembly of the coupling device 9, the user still being able to readily disengage the first connector part 10 from the second connector part 11.

As a further alternative, the disengagement means  
20 may be formed integrally with the first or the second connector part, e.g. as an arm hingedly connected with the first or the second connector part and comprising a hook section engaging the other connector part. By activating the arm, the first and the  
25 second connector parts are substantially pulled out of each other.

Furthermore, the coupling device 9 is not limited to use in the coupling between the probe 3 and the tubes 6, 7 but may also be applied in other couplings  
30 of the irrigation system, e.g. in the coupling between the tubes and the control unit or between the tubes and the reservoir.

Claims

1. A coupling device (9) comprising a first connector part (10) and a second connector part (11), each connector part (11, 10) comprising at least one  
5 connecting portion (16a, 16b, 13, 14) for engagement with at least one corresponding connecting portion (16a, 16b, 13, 14) of the other connector part (11, 10), a disengagement means (12) being provided for at least assisting in disengaging the engagement between  
10 said connecting portions (13, 14, 16a, 16b), characterized in that each connector part (11, 10) comprises at least two connecting portions (13, 14, 16a, 16b).

2. A coupling device (9) according to claim 1,  
15 in which the disengagement means (12) is connected with the first connector part (10) and comprises engagement means for engagement with corresponding engagement means on the second connector part (11).

3. A coupling device (9) according to claim 2,  
20 in which the second connector part (11) comprises a disk (23) including a through-going hole (26, 27) in connection with each corresponding connecting portion (16a, 16b), the engagement means of said connector part being provided on said disk (23).

4. A coupling device (9) according to claim 3,  
25 in which the engagement means of the disengagement means (12) comprises internal threads (18) and the engagement means of the second connector part comprises external threads (21).

5. A coupling device (9) according to claim 4,  
30 in which the holes (26, 27) in the disk (23) of the second connector part (11) are arranged with a small spacing, and/or in which the external threads (21) of the engagement means of the second connector part  
35 (11) comprise at least one recess (25).

6. A coupling device (9) according to claim 2 or 3, in which the engagement means (18, 21) comprises a bayonet coupling including at least one

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track in the disengagement means (12) and at least one projection on the second connector part (11), said at least one track including at least one portion extending obliquely with respect to the axial direction of the disengagement means.

7. A coupling device (9) according to any one of the preceding claims, in which at least some of said connecting portions (16a, 16b, 13, 14) have such an axial extension that the first and the second connector parts (11, 10) are brought into connection with each other before activation of the disengagement means (12).

8. A coupling device (9) according to any one of the preceding claims, in which said disengagement means (12) comprises handle means (22).

9. A coupling device (9) according to any one of the preceding claims, in which the first connector part (10) comprises two male luer lock connecting portions (13, 14) and the second connector part comprises two female luer lock connecting portions (16a, 16b).

10. A probe (3) for an irrigation system, comprising a first connector part (10) or a second connector part (11) of a coupling device (9) according to any one of the claims 1 to 9.

11. A method of disengaging the engagement between a first and a second connector part (10, 11) of a coupling device (9) according to any one of the claims 1 to 9, wherein said disengagement means (12) is activated in such a way that the first and the second connector parts are substantially pulled out of each other.

12. An irrigation system comprising a reservoir for irrigating liquid, a probe for arrangement in a user, conduit means for conducting the irrigating fluid from the reservoir to the probe, and a control unit connected with at least one part of the conduit means, wherein a coupling device according to any of

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the claims 1 to 9 is provided at the probe and/or the reservoir and/or the control unit.

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## Coupling device

## A B S T R A C T

5 The coupling device (9) comprises a first connector part (10) and a second connector part (11), the connector parts (11, 10) comprising connecting portions (16a, 16b, 13, 14) for engagement with corresponding connecting portions (16a, 16b, 13, 14) of the other connector part (11, 10). A disengagement means (12) is provided for assisting in disengaging the engagement between the connecting portions (13, 14, 16a, 16b).

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(Figs. 2 and 3a)



Modtaget

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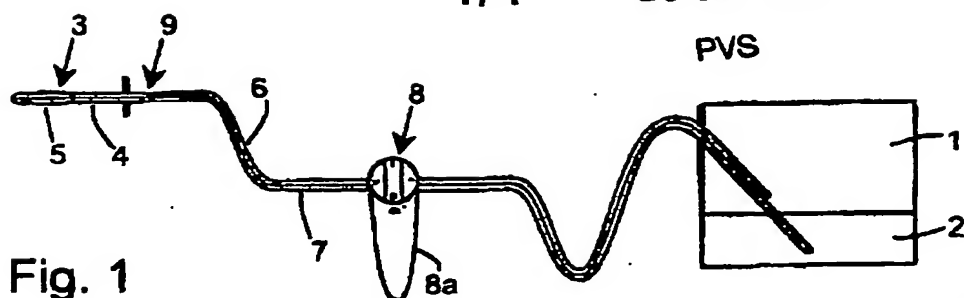


Fig. 1

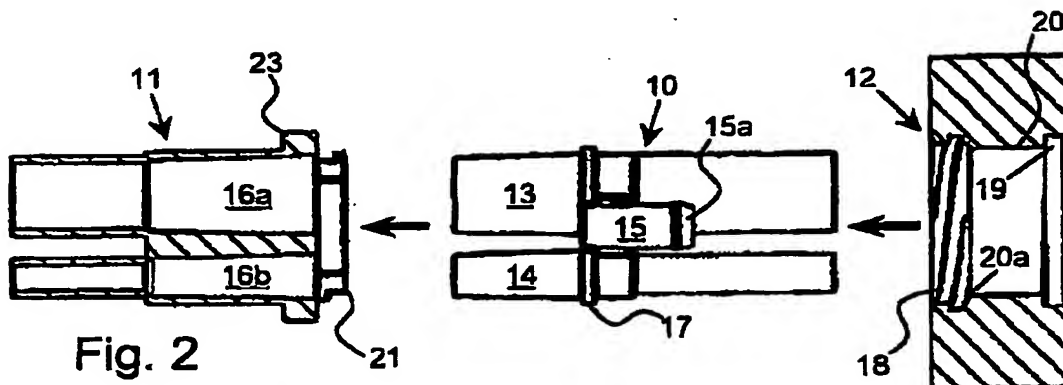


Fig. 2

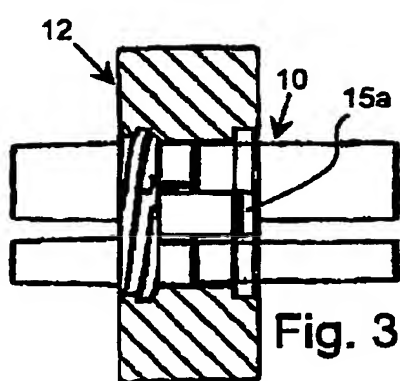


Fig. 3

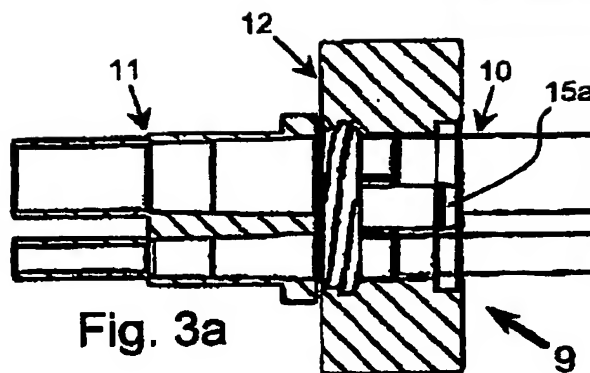


Fig. 3a

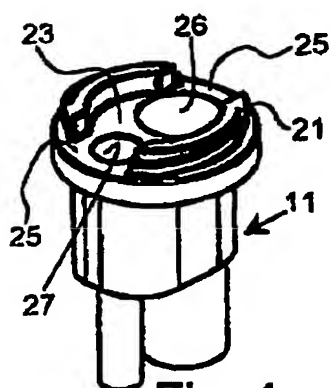


Fig. 4

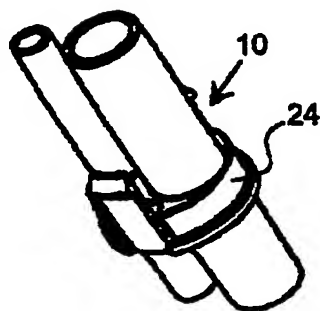


Fig. 5

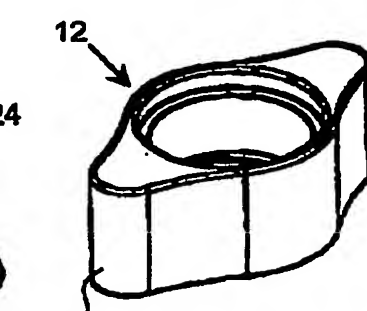


Fig. 6

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